

A COLLECTION OF FRESHWATER SHELLS FROM KAMCHATKA

BY W. J. EYERDAM

The Kamchatka peninsula which is surrounded by the sea on three sides and bordered on the north by a vast treeless tundra, might be regarded from a biological standpoint as an island. One would expect its flora and fauna to represent a great array of endemic species, but such is not the case. The flora, which is far from original, consists largely of circumpolar and subalpine plants. The fauna is meager in species and consists mostly of forms having a wide range in the circumboreal regions. Local races are not sharply defined and represent a more recent development in evolution.

The general impression that one receives upon a study of the flora is one of violent volcanic catastrophes on a grand scale and of great ice masses that have displaced and pauperized the vegetation of pre-Quaternary period. After the glacial times Kamchatka was restocked by Arctic biological forms. Through glacial and volcanic destruction very few refugia or glacial islands have persisted down to the present, so there are not many relict biotic species to be found in the peninsula. The Winters are long and cold and the Summers are short and hot. Deep snow persists right down to the sea until May. Sometimes drifts of snow cover certain valleys until July, and often there are violent eruptions in this land of over 100 volcanoes, that destroy all the vegetation within the area of hundreds of square kilometers.

As a result of unfavorable conditions one cannot expect to find an abundance of molluscan species. The total known land snail fauna is about fifteen species.

In the Summer of 1925 while engaged on a salmon fishing excursion to the mouth of the Kamchatka river for a Seattle mild cure concern, I had occasion to go ashore from the schooner *Apollo* and collect shells and plants during spare time. Again in 1928 while engaged in collecting plants for the well known Swedish botanist, Dr. Eric Hulten, I collected freshwater shells in the region around Avatcha bay in South Kamchatka. The only large river in this region is the Avatcha river and no shells could be

found in the stream bed itself. Ponds with growing vegetation, as elsewhere, favor the growth of molluscs which were taken in such places.

Most of the following freshwater shells that I collected were kindly classified by Dr. C. Goodrich after the death of Dr. Bryant Walker to whom I had submitted them in 1931. The identifications are based mostly on Westerlund's descriptions and I believe by comparison of species in the Walker collection. There are three species in the lot that were not reported previously from Kamchatka.

1. *Pisidium dilatatum* Westerlund, 1928. Savoika in a pond. July, 1925. Not common.

2. *Pisidium sibiricum* Clessin. In mud amongst stones and pebbles of a swiftly running brook which freezes solid in winter. Gulf of Kronotski about 20 miles south of the mouth of Kamchatka river. Not common.

3. *Anodonta beringiana* Midd. One specimen in August, 1925, in a flood plain pond near the mouth of Kamchatka river.

4. *Margaritana margaritifera* L. In 1925 in the Kamchatka river. One valve.

5. *Lymnaea pervia* Mts. August, 1928. Not common. Dark green horn color. In ponds along Avatcha river on *Callitriche verna* L., *Potamogeton filiformis-pers* Laest. *Potamogeton gramineus* L. and *Sparganium hyperboreum*. In a tundra pond on Mt. Polovinaja near Savoika in July, 1928. Light horn color. On *Potamogeton graminicus* and *Sparganium hyperboreum*. In a small lake at Petropavlovsk on stones and on *Ruppia spiralis* L. in July, 1928. At Port Arthur, Manchuria, October 28, 1928, in a rice irrigation ditch. Abundant. These are larger than the Kamchatka form.

6. **Lymnaea atrata* Westerlund. August, 1928. Abundant around the Nulichevo hot springs. This species is said to be common in most of the larger hot springs of Kamchatka but does not seem to occur elsewhere. The flora of these hot springs is quite unique and many of the plant species are found only in such places in Kamchatka.

* New to Kamchatka.

7. *Lymnaea ovata* (Draparnaud) Westerlund. July, 1925. Ustj Kamtchatsk in a flood plain.

8. *Lymnaea aberrans* Westerlund. August, 1928. Malka hot springs in 30 degrees Cent.

9. *Lymnaea palustris* Müller var. *terebra* Westerlund. July, 1925. Ustj Kamtchatsk in a flood pond.

10. *Lymnaea stagnalis sorensis* Dybowski. July, 1925. Ustj Kamtchatsk in a flood pond.

11. *Valvata sibirica* Middendorff. This species is reported by Rosen from Kamchatka and its range is from northern Sweden to N. E. Siberia. In 1932 I found it in lakes on the islands Unimak, Unalaska, and Atka in the Aleutians. I did not find it in Kamchatka.

12. *Planorbis (Gyraulus) exilis* Westerlund. September 1, 1928. In a mountain tundra pond on Mt. Polovinaja on *Potamogeton* and *Sparganium*.

13. **Planorbis contortus* L. July, 1928. Two specimens in a flood pond at Ustj Kamtchatsk. Not typical. Determined by Vanatta.

14. **Planorbis exilis* Westerlund. In flood plain ponds at Petropavlovsk, July, 1928. Savoika on Avatcha river, July 20, 1928, and at Harbin, Manchuria, October 12, 1928.

15. *Bithynia robusta minor* von Moellendorff. In a flood pond of the Sungari river near Harbin, Manchuria, October 12, 1928.

The Kamchatka river which is nearly as large as the Columbia, harbors practically all the fluviatile molluscs of Kamchatka, and the same species are to be found in most of the great river systems of Siberia and northern Russia. Little seems to be known about the shells of thermal springs and their distribution except that most of them are species of *Lymnaea*. Perhaps they have been distributed in the larval stage by the agency of water birds.

In 1908-1909 an adjunct of the great Riabusinski biological expedition to Kamchatka, Baron von Rosen published a report on the land and freshwater shells that were collected in that region. The paper is printed in Russian and lists 14 terrestrial and 31 freshwater species. The title is "Mollusques terrestres et d'eaux douces, recueillis au Kamtschatka par l'expédition de Mr. Th.

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Riabusinsky en 1908-1909'' Annuaire du Musée Zoologique de l'Acad. des Sciences de L' U. S. S. R. 1926. pp. 262-274, by O. V. Rosen.

As this paper is apparently quite unknown and almost inaccessible in America, I include the following species that are in this report but are species that I did not find.

Nearly all of these forms were collected in the Kamchatka river. Unfortunately I had only about one hour of collecting in that stream in 1925.

The following list of shells are in Rosen's report but are not in the collection of Eyerdam. They are:

Gulnaria auricularia lanuginosa Dybowski.

“ *ovata* var. *patula* Westerlund.

“ *kamtschatica* Midd.

“ *peregra* Drap. var. *middendorffi* Dybowski.

“ “ “ *pseudo-elongata* Dybowski.

Lymnaea palustris Müller var. *fusca* Pfeiffer.

Fossaria truncatula sibirica Westerlund.

Physa hypnorum L.

Planorbis borealis Lovén.

“ “ var. *dershavini* Rosen.

“ *moellendorfi* Dybowski.

“ *kamtschaticus* Westerlund.

Bithynia leachi Schp. var. *inflata* Hans. * This *Bithynia* may be the same form as I found in October, 1928 at Harbin, Manchuria, which Goodrich classified as *B. robusta minor* Moellendorff.

Valvata stelleri Dybowski.

Sphaerium asiaticum Mts.

“ *nitidum* Clessin.

Calymene lacustris Müller.

Pisidium amnicum Müller.

“ *nordenskiöldi* (Clessin) Westerlund.

Margaritana middendorffi Rosen.

These shells are in the collection of the museum of the Academy of Sciences in Leningrad, and the others are in the collection of Eyerdam.